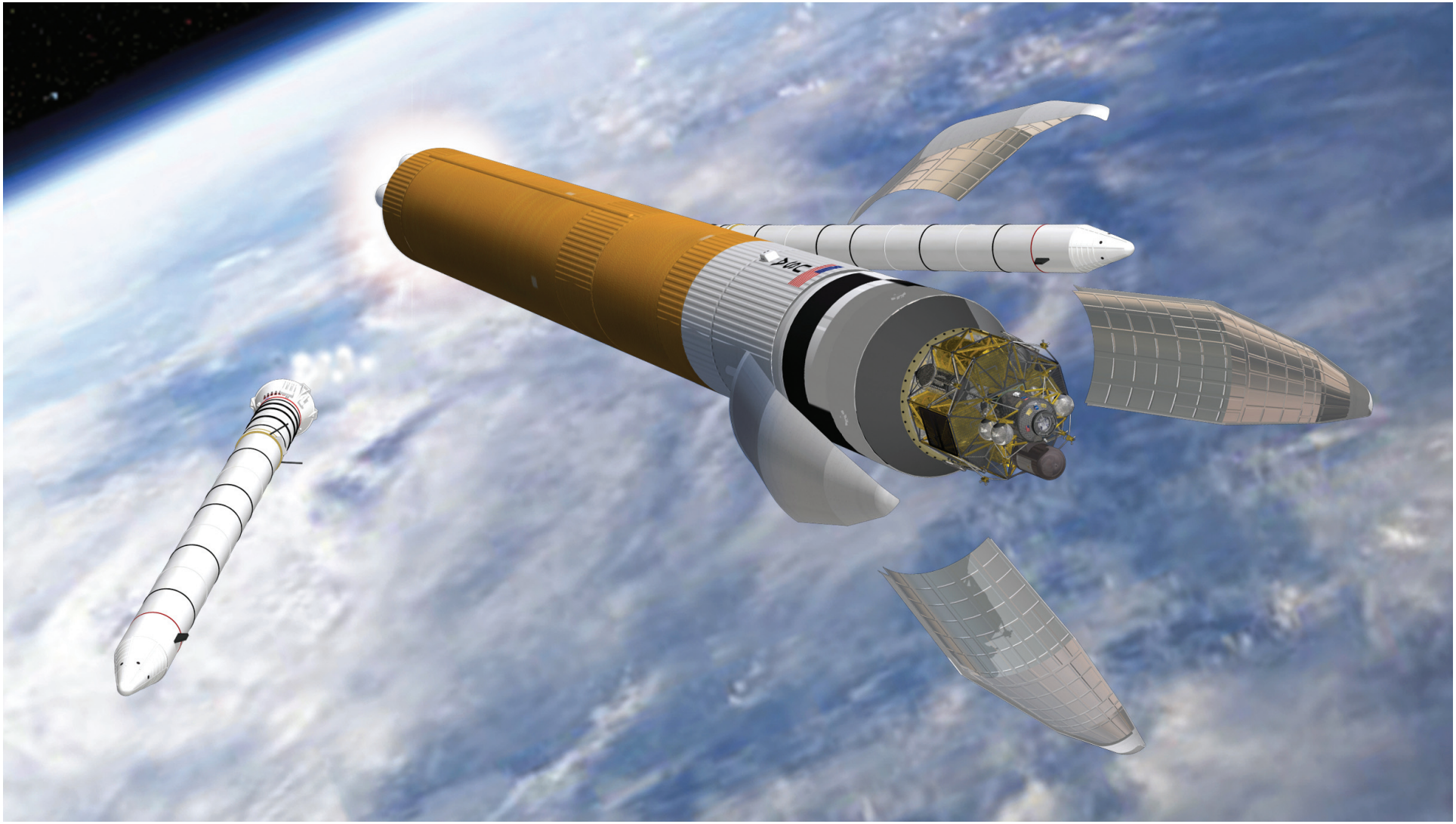
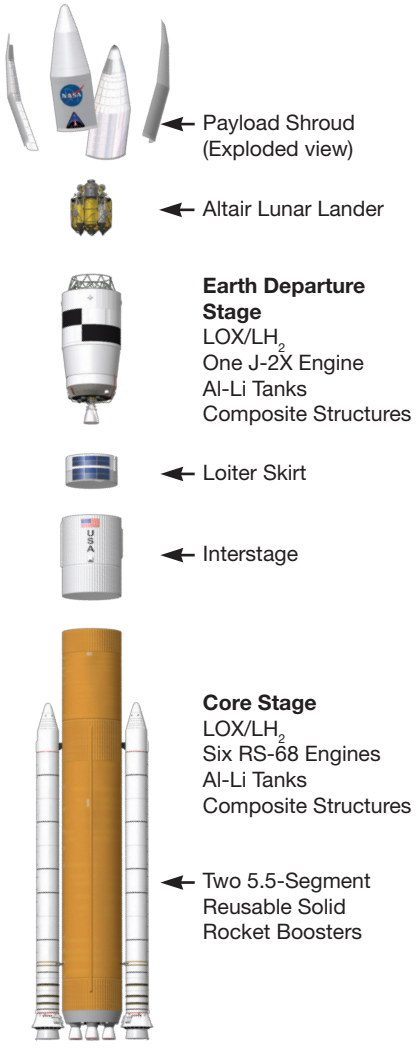
National Aeronautics and Space Administration



The Ares V Cargo Launch Vehicle will work in tandem with the Ares I Crew Launch Vehicle to deliver the power to explore the Moon and beyond.

www.nasa.gov

NASA's Ares Projects — Ares V Cargo Launch Vehicle



The Ares V will provide unprecedented capability to explore the Moon and establish a permanent outpost there in the next decade. NASA is designing the Ares V to send more than 40 percent more mass to the Moon than the Apollo-era Saturn V rocket. That increase in payload mass, as well as an increase in volume, will open the door to exciting new possibilities for exploration, science, and discovery.

Ares V will work in tandem with the Ares I crew launch vehicle. By separating the crew and cargo rockets while sharing similar propulsion elements — and by building on proven hardware while using modern engineering practices — NASA is building a safe, reliable, cost-efficient transportation system for exploration. This, in turn, will enable sustainable, long-term space exploration and discovery.

Powering Discovery

In the 2020 time frame, the Ares V will begin lifting heavy payloads, such as the Altair lunar lander, to Earth orbit or to "translunar injection" — a trajectory designed to intersect with the Moon's orbit. This will enable NASA to carry a variety of payloads for scientific exploration and, in time, embark on the first human missions to Mars and beyond.

The mammoth Ares V will stand roughly 381 feet tall and weigh more than 8 million pounds at liftoff. (See drawing left) During the launch of the first missions to the Moon, the Ares V Solid Rocket Boosters and Core Stage powered by a cluster of six RS-68 rocket engines will power the Ares V into space. After the boosters and Core Stage use all their propellants, they will separate, and the Earth Departure Stage — carrying Altair beneath its large 33-foot-diameter shroud — will ignite its J-2X engine and go into Earth orbit. There, it will rendezvous with the Orion crew exploration vehicle, launched into orbit by the Ares I. Orion will dock with Altair, and the Earth Departure Stage will ignite again to send the coupled spacecraft to the Moon. Once the astronauts arrive in lunar orbit, they will check out systems, transfer to Altair, and descend to the Moon, while Orion remains in orbit. On the Moon, astronauts will explore the terrain and conduct experiments. After completing their mission, the crewmembers will return in Altair to lunar orbit and dock with Orion for the return to Earth.

With a capability of sending more than 156,000 pounds to the Moon, the Ares V also is expected to be used in a fully automated mode to deliver habitats, rovers, scientific equipment, and other supplies to the lunar outpost. This heavy-lift launch capability will also be able to carry a variety of potential future exploration payloads in support of human or robotic missions.

The Ares V employs the best in design and technology from the past and present. It will use two Space Shuttle-derived 5.5-segment Solid Rocket Boosters and a J-2X engine evolved from the engine used on the Apollo-era Saturn IB and Saturn V rockets. The Ares V Core Stage also uses a cluster of commercially-available RS-68 engines designed for efficient, robust operation.

A Nationwide Team

The Ares I and Ares V development efforts, now in various stages of planning, design, and testing, include multiple teams at NASA Centers and is led by the Ares Projects at NASA's Marshall Space Flight Center in Huntsville, AL, under the direction of the Constellation Program at NASA's Johnson Space Center in Houston, TX, and the Exploration Systems Mission Directorate at NASA's Headquarters in Washington, DC.

For more information see: **www.nasa.gov/ares**

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